**Ecology**

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# Ecology

Ecology (from Greek: οἶκος, "house", or "environment"; -λογία, "study of")[A] is the branch of biology[1] which studies the interactions among organisms and their environment. Objects of study include interactions of organisms with each other and with abiotic components of their environment. Topics of interest include the biodiversity, distribution, biomass, and populations of creatures, as well as assistance and competition within and between species.

Heading 2

Ecosystems are dynamically interacting systems of organisms, the communities they make up, and the non-living workings of their atmospheres. Ecosystem processes, such as primary production, pedogenesis, nutrient cycling, and niche construction, regulate the flux of energy and matter through an environment. These processes are sustained by organisms with specific life history traits. Biodiversity means the varieties of species, genes, and ecosystems, enhances certain ecosystem services.

# Habitat

Habitat of a species describes the environment over which a species is known to occur and the type of community that is formed as a result.[24] More specifically, "habitats can be defined as regions in environmental space that are collected of multiple dimensions, each representing a biotic or abiotic environmental variable; that is, any component or characteristic of the environment related directly (e.g. forage biomass and quality) or indirectly (e.g. elevation) to the use of a location by the animal.

## Heading 2

"[25]:745 For example, a habitat might be an aquatic or terrestrial environment that can be further categorized as a montane or alpine ecosystem. Habitat shifts provide important evidence of competition in nature where one population changes relative to the habitats that most other individuals of the species occupy. For example, one populace of a species of tropical lizards (Tropidurus hispidus) has a flattened body relative to the main populations that live in open savanna. The population that lives in an isolated rock outcrop hides in crevasses where its flattened body offers a selective advantage. Habitat shifts also occur in the developmental life history of amphibians, and in insects that transition from aquatic to terrestrial habitats. Biotope and habitat are sometimes used interchangeably, but the former applies to a community's environment, whereas the latter applies to a species' environment.[24][26][27]Additionally, some species are ecosystem engineers, altering the environment within a localized region. For instance, beavers manage water levels by building dams which advances their habitat in a landscape.

# Niche Definitions

Niche Definitions of the niche date back to 1917,[30] but G. Evelyn Hutchinson made conceptual advances in 1957[31][32] by introducing a widely adopted definition: "the set of biotic and abiotic conditions in which a species is able to persist and maintain stable population sizes."[30]:519 The ecological niche is a central concept in the ecology of organisms and is sub-divided into the fundamental and the realized niche. The fundamental niche is the set of environmental conditions under which a species is able to persist. The realized niche is the set of environmental plus ecological conditions under which a species persists.

## Heading 2

Biogeographical patterns and range distributions are explained or predicted through knowledge of a species' traits and niche requirements

Class Schedule

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **LESSON** | **TOPIC** | **ASSIGMENT** | **points** | **DUE** |
| 1 | What is Distance Learning? | Wiki #1 | 10 | March 10 |
| Presentation | 20 |  |
| 2 | History &Theories | Brief Paper | 20 | March 24 |
| Spring Break | | | | |
| 3 | Distance Learners | Discussion #1 | 10 | April 7 |
| Group project | 50 | April 14 |
| 4 | Media Selection | Blog #1 | 10 | April 21 |

# Biosphere

Biosphere The largest scale of ecological organization is the biosphere: the total sum of ecosystems on the planet. Ecological relationships regulate the flux of energy, nutrients, and climate all the way up to the planetary scale. For example, the dynamic history of the planetary atmosphere's CO2 and O2 composition has been affected by the biogenic flux of gases coming from respiration and photosynthesis, with levels fluctuating over time in relation to the ecology and evolution of plants and animals.[46] Ecological theory has also been used to explain self-emergent regulatory phenomena at the planetary scale: for example, the Gaia hypothesis is an example of holism applied in ecological theory.[47]

## Heading 2

The Gaia hypothesis states that there is an emergent feedback loop generated by the metabolism of living organisms that maintains the core temperature of the Earth and atmospheric conditions within a narrow self-regulating range of tolerance.[48]

Biome

Biome are larger units of organization that categorize regions of the Earth's ecosystems, mainly according to the structure and composition of vegetation.[42] There are different methods to define the continental boundaries of biomes dominated by different functional types of vegetative communities that are limited in distribution by climate, precipitation, weather and other environmental variables. Biomes include tropical rainforest, temperate broadleaf and mixed forest, temperate deciduous forest, taiga, tundra, hot desert, and polar desert.[43] Other researchers have recently categorized other biomes, such as the human and oceanic microbiomes. To a microbe, the human body is a habitat and a landscape.[44]

Heading 2

Microbiomes were discovered largely through advances in molecular genetics, which have revealed a hidden richness of microbial diversity on the planet. The oceanic microbiome plays a significant role in the ecological biogeochemistry of the planet's oceans.[45]

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